

Quick Guide to Quarantine at Home

Basic Principles: Air

- Outside air can be assumed to be safe as it's coming into the living space so long as there is not a dense crowd or a potentially contagious person lingering by a window for a long time.
- Any air exposed to someone potentially exposed to the disease you are quarantining against should be assumed to be unsafe.
- For other air, you will need to think about it based on how much opportunity it has had to be exposed to safe or unsafe air, or exposure to a purifier / filter.
- Active mixing, such as movement by fans, will speed up the spread of virus particles much more than passive mixing. This can be good, if it dilutes them with outside air or air from a purifier / filter which will gradually turn unsafe air into safe air, or bad if it puts virus particles into other indoor spaces, turning safe air into unsafe air.

How does home AC work?

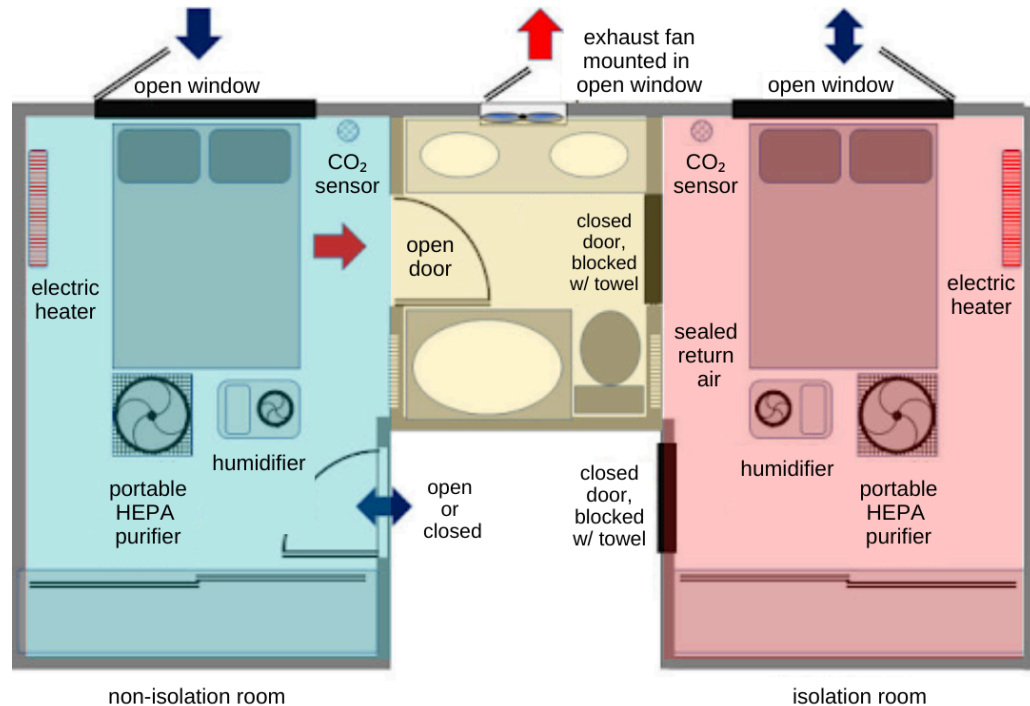
- *Intakes* are large gratings on the inside of the house. There are usually only a few of these. They feed air into the indoor unit.
- *Vents* are where the heated/cooled air comes out of. There are usually at least one per room. They're where the treated air comes out of, and may be called other things, like *registers* if they're on the floor.
- The *indoor unit* of an AC cools or heats the air, and includes a fan to move it through the ducts.
- The *outdoor unit* of an AC performs heat exchange with the outside air.
- When the AC cycles on, air comes in through the intakes, is cooled or heated in the indoor unit, and then is blown out through the vents. No outside air comes in.

Quarantine

- Quarantine is when an exposed person is being kept away from non-exposed people.
- Basic principle: no air that has been exposed to the exposed person should be able to directly reach non-exposed people.
- Assuming the exposed person can be confined to one or two rooms that nobody else will use:
 - Close the doors to those rooms and block the underneath with towels.
 - BLOCK ANY INTAKES in those rooms. I'd suggest using towels/blankets followed by cardboard, securely taped on. The seal does not have to be perfect- the system will preferentially take from the freest intakes. However, it should still be as good as possible.

- Set the AC fan to always be on (most units have a setting for this). This will make sure no viral particles or bacteria can diffuse up through the vents to other rooms.
 - Open at least one window if possible (if not see below for air quality notes).
- If deliveries (such as food) need to be made to the quarantined person:
 - If you can hand the stuff in through an open window that's probably ideal.
 - If that's not an option:
 - Have everyone in the house put on a respirator (tightly-fitting N95, KN95, KF94, FFP2 or better before the delivery.
 - Unblock and open one door calmly, make the delivery, shut and block the door.
 - The quarantined person can now unmask. Everyone else should remain masked for a while- with proper ventilation or air purification, about 30 minutes, though longer will always be better.
- If the quarantined person needs a caretaker:
 - Same procedure as deliveries but now the caretaker is the delivery. That is:
 - Have everyone in the house put on a respirator (tightly-fitting N95, KN95, KF94, FFP2 or better before the caretaker enters the space.
 - Unblock and open one door calmly, have the caretaker enter the room, shut and block the door.
 - Everyone else in the living space should remain masked for a while- with proper ventilation or air purification, about 30 minutes, though longer will always be better.
 - Have the caretaker and quarantined person mask while care is being given. The caretaker using disposable gloves is probably also a good idea. The caretaker wearing scrubs for this (that are changed out of as soon as possible after leaving the quarantined space) could be an additional step if transmission on surfaces is a concern.
 - COVID is not likely to spread from objects and surfaces, but some other pathogens can spread on surfaces, including measles.
 - The caretaker should stay for the minimum possible time to minimize the caretaker's exposure.
 - Follow the same procedures for exit as for entering. After the caretaker has exited the room and the door is sealed, the caretaker should immediately unglove and dispose of gloves if applicable. The caretaker should then wash hands thoroughly. If you want to be extra safe, the caretaker can also change clothes. They should definitely do this if the exposed person coughed on them or otherwise exposed them to bodily fluids.
- If the quarantined person needs to use the bathroom:
 - Ideally, they have their own in their designated quarantine rooms.

- If that's not an option, then the second best would be to have this sort of setup



(source: [healthyheating.com](https://www.healthyheating.com) via [People's CDC](https://www.cdc.gov))

- The humidifier and heater are for comfort, the HEPA purifier and CO₂ sensor are for safety.
- Image description: A bedroom on the left labeled “non-isolation room”, containing a bed, CO₂ sensor, electric heater, portable HEPA purifier, and humidifier. The door leading to the rest of the house is labeled “open or closed”. There is a window in this room that is open. There is a bedroom on the right labeled “isolation room”, also containing a CO₂ sensor, electric heater, portable HEPA purifier, and humidifier. The door leading to the rest of the house is labeled “closed door, blocked with towel”. There is a window in this room that is open. Between the two bedrooms is a bathroom, containing sinks, a bathtub, and a toilet. The door leading to the non-isolation room is open. The door leading to the isolation room is labeled “closed door, blocked with towel”. There is a window with a fan on it, labeled “exhaust fan mounted in open window”. Finally, there are arrows to show air flow. There is a blue arrow pointing inwards from the

non-isolation room's open window, a double-headed arrow across the "open or closed" door in the non-isolation room, a red arrow pointing towards the bathroom from the non-isolation room through the open door, a red arrow pointed out of the bathroom window, and a blue double-headed arrow pointing between the isolation room and the open window.

- If *that's* not an option, and the exposed person has to leave their quarantine space:
 - Everyone mask up.
 - Exposed person leaves their room (unblock the door, open the door, close the door, re-block the door), does their business, and returns to quarantine. They can unmask once back in quarantine.
 - If the quarantined person must unmask, for instance if they need to shower, then the bottom of the bathroom door should be blocked with a towel and ventilation taken care of as outlined above, turning the bathroom into a temporary quarantine space.
 - When the quarantined person is done, they should replace their mask, exit the bathroom, and re-block the bathroom door with a different towel from the other side.
 - Open all windows you can in the non-quarantined space, have fans blowing out of those windows if possible. ESPECIALLY in the bathroom.
 - Wait a while before unmasking. While individual circumstances can differ, at least an hour can be a good rule of thumb.

Reverse Quarantine

- Applies when the exposed people need / have the run of the house and a non-exposed person needs to be kept safe.
- Basic principle is the same as regular quarantine, but the procedures are notably different.
- Assuming the non-exposed person can be confined to one or two rooms that nobody else will use:
 - Close the doors to those rooms and block the underneath with towels.
 - CLOSE ANY VENTS in those rooms. Most household vents can be opened and closed with a lever. If this isn't possible, turn off the circulation altogether and block them as best you can. I'd suggest using towels/blankets followed by cardboard, securely taped on.
 - Open at least one window if possible (if not see below for air quality notes).
 - Check outside air quality against your own health needs when determining if you should open a window.
 - If you need to turn off circulation, then you might want to use a dehumidifier, depending on your local climate.
- If deliveries (such as food) need to be made to the reverse-quarantined person:
 - If you can hand the stuff in through an open window that's probably ideal.

- If that's not an option:
 - Have everyone in the house mask before the delivery.
 - Unblock and open one door calmly, make the delivery, shut and block the door.
 - The non-reverse-quarantined persons can now unmask. The quarantined person should remain masked for some amount of time afterward- this depends on your airflow and purification setup, and I really don't have the basis to make concrete recommendations.
- If the reverse-quarantined person needs a caretaker:
 - If at all possible, have the caretaker stay in reverse-quarantine too if they are not themselves exposed or positive.
 - If this is not possible:
 - Minimize how much the caretaker comes and goes from the reverse-quarantined space into potentially contaminated spaces.
 - Each time the caretaker enters the reverse-quarantine, follow the delivery procedures. The caretaker should also immediately wash their hands thoroughly on entering.
 - The caretaker and reverse-quarantined person should both remain masked at all times within the reverse-quarantine.
 - If the caretaker is exposed or positive, there is not much more to be done while the space is being shared. After the caretaker has left, the reverse-quarantined person should remain masked for at least an hour and should wash their hands thoroughly or use hand sanitizer.
- If the quarantined person needs to use the bathroom:
 - Again, it's ideal for a bathroom to be in the reverse-quarantined suite of rooms.
 - If not that, see the diagram above, but now the blue ("non-isolation") zone is the reverse-quarantine and the red zone is the rest of the living space.
 - If *that's* not an option, and the reverse-quarantined person has to leave their reverse-quarantine space:
 - Everyone mask up.
 - Reverse-quarantined person leaves their room: unblock the door, open the door, close the door, re-block the door. They then do their business and return.
 - The non-reversed-quarantined persons may unmask. The reverse-quarantined person should remain masked for a while, time dependent on circulation and purification conditions. If there's any measures to ventilate the reverse-quarantine space that cannot be used constantly but may be used occasionally, use them at this time. They should also consider using hand sanitizer once back in reverse-quarantine.

The exposed person is feeling better, should I stop all these precautions?

- It's important to note that symptoms don't equal infectiousness and that living with someone with a contagious airborne pathogen is a significant exposure.
- If someone tests positive on a rapid test (such as for COVID or flu), it's important to assume that they are still infectious.
- It's also important to know that taking one test is insufficient to determine if someone is still positive, because rapid tests work best if taken multiple times. I understand this is a costly strategy. Community organizations such as mask blocs may have advice on accessing free rapid tests. If taking multiple rapid tests is not possible, consider two weeks as the minimum isolation period. However, some people can continue to test positive on rapid tests after two weeks, so the best course is to test negative several times across a period of five days before removing quarantine.

What about CO₂ buildup?

- You probably do not need to worry about this. Air wants to fix itself. If you're in a basement with no windows though you might want to try to research this on your own for your particular situation.
- You definitely do not need to worry about this if you can open a window in your space.
- You can buy a monitor to get precise measurements about the level of CO₂ in the space if funds allow.

It's too cold

- Buy a space heater if funds allow. Blankets and warm clothes can also be helpful.

It's too hot

- Ok yeah this one is harder.
- If you can get a window-mounted AC unit, that's probably your most effective option.
- If that's not an option, water is your friend. Leave out containers of water that have a high exposed surface area. The water will evaporate and cool the area. This will work better the lower humidity it is outside. If this raises the inside humidity too much, try to get a dehumidifier.
- You can also use ice. Just put a bag of ice in a bucket, preferably a metal bucket, or out in pans. The ice melting will cool down the space. Use a fan to continually blow uncooled air over the ice for maximum effect.

The people I live with are uncooperative

- The above procedures are then limited to what one person can do, which is less effective, but there are still ways to limit exposure.
- Be very strict about your respirator use. If possible, only unmask in your own room.
- Invest in a HEPA purifier if possible.
- SIP valves can create a space to fit a straw into your respirator without breaking the seal.
- Probably at least double any waiting times- people breathing freely means more potential virus in the air means greater time needed for it to disperse from the safe spaces.

I live in an apartment

- There are a large amount of factors that can impact airflow in apartment spaces that can make general advice more difficult to give.
- If you have your own AC unit that isn't connected to any other apartments, then the above procedures should work equivalently, but you might need to contact maintenance to close any vents.
- If you have central air, it is harder to limit your exposure to your neighbors. Talk to your apartment manager. In particular, ask how the HVAC works- is the air centrally filtered enough to stop viruses and bacteria? Is inside air continually replaced with outside air? Does it have inside intakes? The principles of quarantine and reverse quarantine remain the same, but you will have to derive the procedures for your specific use case.

Wow this seems so strict

- Yeah, I wrote this to be about as strict as you can get in a home environment. You can find less strict procedures in a lot of places. It all depends on your risk tolerance and what you can afford to do. But many airborne pathogens are serious and can have long-lasting health effects, so make sure to consider more than the immediate effects when evaluating your tolerance.

Who are you

- I have no formal qualifications, I just know stuff about things and look up what I don't know.
 - I mean, I *am* a physicist nearing completion on my Ph.D., so I know more than your average layperson about how airflow works, but that's not what I actually study, and biosciences are mysterious to me.
- If anything I've said is contradicted by an expert, *if they're a real scientific or trade expert and not someone trying to sell you something*, I'd trust what they say over me.